

WHAT WE CLAIM IS:

1. A nucleic acid molecule of a sheep type of *M. paratuberculosis* said molecule comprising SEQ ID NO. 1 or a complement thereof.
2. A probe comprising SEQ ID NO.1 or a complement thereof.
- 5 3. A probe comprising at least 6 contiguous nucleotides selected from nucleotides 1 – 35 of SEQ ID NO. 1 a complement thereof.
4. A probe comprising at least 10-12 contiguous nucleotides selected from nucleotides 1 – 35 of SEQ ID NO. 1 or a complement thereof.
5. A probe comprising at least 20 or more contiguous nucleotides selected
10 from nucleotides 1 – 35 of SEQ ID NO. 1 or a complement thereof.
6. A probe comprising at least 6 contiguous nucleotides selected from nucleotides 230 – 260 of SEQ ID NO. 1 or a complement thereof.
7. A probe comprising at least 10-12 contiguous nucleotides selected from nucleotides 230 – 260 of SEQ ID NO. 1 or a complement thereof.
- 15 8. A probe comprising at least 20 or more contiguous nucleotides selected from nucleotides 230 – 260 of SEQ ID NO. 1 or a complement thereof.
9. The use of a nucleic acid molecule or probe as claimed in any one of claims 1-7 for detecting the presence of sheep types of *M. paratuberculosis*.
- 20 10. The use of SEQ ID NO 2 or, a fragment or complement thereof for detecting the presence of cattle types of *M. paratuberculosis*.

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11. A method of distinguishing between cattle and sheep types of *M. paratuberculosis* comprising the step of comparing differences between the nucleotide sequences of SEQ ID NO. 1 and SEQ ID NO. 2 or complements of said sequences.
- 5 12. A method of detecting the presence of *M. paratuberculosis* in a sample via a nucleic acid amplification technique said method comprising the steps of:
- 10 a) taking a sample from an animal or any other source;
- b) extracting nucleic acids from the sample or culturing mycobacteria from the sample and extracting nucleic acids from the mycobacterial culture;
- c) performing a nucleic acid amplification technique; and
- d) determining the identity of the amplification product.
13. A method as claimed in claim 12 wherein the animals may include cattle, sheep, deer, goats, ferrets, rabbits and humans.
- 15 14. A method as claimed in claim 12 wherein step d) of the method comprises identifying the presence of at least 6 nucleotides of the nucleic acid molecule comprising SEQ ID NO. 1 or a complement thereof.
15. A method as claimed in claim 12 wherein step d) of the method comprises identifying the presence of 10-12 contiguous nucleotides of the nucleic acid molecule comprising SEQ ID NO. 1 or a complement thereof.
- 20 16. A method claimed in claim 12 wherein step d) of the method comprises identifying the presence of at least 15 contiguous nucleotides of the nucleic acid molecule comprising SEQ ID NO. 1 or a complement thereof.

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17. A method as claimed in claim 12 wherein step d) of the method comprises identifying the presence of substantially 20 contiguous nucleotides of the nucleic acid molecule comprising SEQ ID NO. 1 or a complement thereof.
- 5 18. A method as claimed in claim 12 wherein step c) utilizes one oligonucleotide primer complementary to at least 6 contiguous nucleotides of SEQ ID NO. 1 or a complement thereof; and one oligonucleotide primer complementary to at least 6 nucleotides of IS900 or a complement thereof.
- 10 19. A method as claimed in claim 12 step c) utilizes one oligonucleotide primer complementary to 10-12 contiguous nucleotides of SEQ ID NO. 1 or a complement thereof; and one oligonucleotide primer complementary to 10-12 nucleotides of IS900 or a complement thereof.
- 15 20. A method as claimed in claim 12 wherein step c) utilizes one oligonucleotide primer complementary to substantially 15 contiguous nucleotides of SEQ ID NO. 1 or a complement thereof; and one oligonucleotide primer complementary to substantially 15 nucleotides of IS900 or a complement thereof.
- 20 21. A method as claimed in claim 12 wherein step c) utilizes one oligonucleotide primer complementary to substantially 20 contiguous nucleotides of SEQ ID NO. 1 or a complement thereof; and one oligonucleotide primer complementary to substantially 20 nucleotides of IS900 or a complement thereof.
22. A method as claimed in claim 12 wherein step c) of the method comprises identifying the presence of at least 6 contiguous nucleotides of the nucleic acid molecule comprising SEQ ID NO. 2 or a complement thereof.

23. A method as claimed in claim 12 wherein step d) of the method comprises identifying the presence of 10-12 contiguous nucleotides of the nucleic acid molecule comprising SEQ ID NO. 2 or a complement thereof.
24. A method as claimed in claim 12 wherein step d) of the method comprises
5 identifying the presence of at least 15 contiguous nucleotides of the nucleic acid molecule comprising SEQ ID NO. 2 or a complement thereof.
25. A method as claimed in claim 12 wherein step d) of the method comprises identifying the presence of approximately 20 contiguous nucleotides of the nucleic acid molecule comprising SEQ ID NO. 2 or a complement thereof.
- 10 26. A method as claimed in claim 12 wherein step c) utilizes one oligonucleotide primer complementary to at least 6 contiguous nucleotides of SEQ ID NO. 2 or a complement thereof; and one oligonucleotide primer complementary to at least 6 nucleotides of IS900 or a complement thereof.
- 15 27. A method as claimed in claim 12 wherein step c) utilizes one oligonucleotide primer complementary to 10-12 contiguous nucleotides of SEQ ID NO. 2 or a complement thereof; and one oligonucleotide primer complementary to 10-12 nucleotides of IS900 or a complement thereof.
- 20 28. A method as claimed in claim 12 wherein step c) utilizes one oligonucleotide primer complementary to substantially 15 contiguous nucleotides of SEQ ID NO. 2 or a complement thereof; and one oligonucleotide primer complementary to substantially 15 nucleotides of IS900 or a complement thereof.
- 25 29. A method as claimed in claim 12 wherein step c) utilizes one oligonucleotide primer complementary to substantially 20 contiguous nucleotides of SEQ ID NO. 2 or a complement thereof; and one

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oligonucleotide primer complementary to substantially 20 contiguous nucleotides of IS900 or a complement thereof.

30. The use of a probe comprising at least 6 contiguous nucleotides selected from the nucleic acid comprising SEQ ID NO. 2 or a complement thereof.
- 5 31. The use of a probe comprising substantially 10-12 contiguous nucleotides selected from the nucleic acid comprising SEQ ID NO. 2 or a complement thereof.
32. The use of a probe comprising at least 15 contiguous nucleotides selected from the nucleic acid comprising SEQ ID NO. 2 or a complement thereof.
- 10 33. The use of a probe comprising at least 20 contiguous nucleotides selected from the nucleic acid comprising SEQ ID NO. 2 or a complement thereof.
34. The use of SEQ ID NO.1 and/or SEQ ID NO. 2, or a fragment or complement thereof, to determine whether a strain of either a sheep type or a cattle type of *M. paratuberculosis* is present in a sample.
- 15 35. The use of SEQ ID NO.1, or a fragment or complement thereof, to distinguish any strain of *M. paratuberculosis* from any other strain of the MAI complex which may be present in a sample.
36. The use of SEQ ID NO.2, or a fragment or complement thereof, to distinguish any strain of *M. paratuberculosis* from any other strain of the
- 20 MAI complex which may be present in a sample.
37. The use of SEQ ID NO.1, or a fragment or complement thereof, to distinguish any strain of *M. paratuberculosis* from any strain of the *M. tuberculosis* complex which may be present in a sample.

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38. The use of SEQ ID NO.2, or a fragment or complement thereof, to distinguish any strain of *M. paratuberculosis* from any strain of the *M. tuberculosis* complex which may be present in a sample.
- 5 39. The use of SEQ ID NO. 1, or a fragment or complement thereof, to detect the presence of *M. paratuberculosis* as a causative agent of Johne's disease or Crohn's disease.
40. The use of SEQ ID NO. 2, or a fragment or complement thereof, to detect the presence of *M. paratuberculosis* as a causative agent of Johne's disease or Crohn's disease.

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